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VERIFICATION OF A TRANSLATION

I, Elisabeth Ann LUCAS,

Director of RWS Group Ltd, of Europa House, Marsham Way, Gerrards Cross, Buckinghamshire, England declare:

That the translator responsible for the attached translation is knowledgeable in the German language in which the below identified international application was filed, and that, to the best of RWS Group Ltd knowledge and belief, the English translation of the amended sheets of the international application No. PCT/DE2003/002605 is a true and complete translation of the amended sheets of the above identified international application as filed.

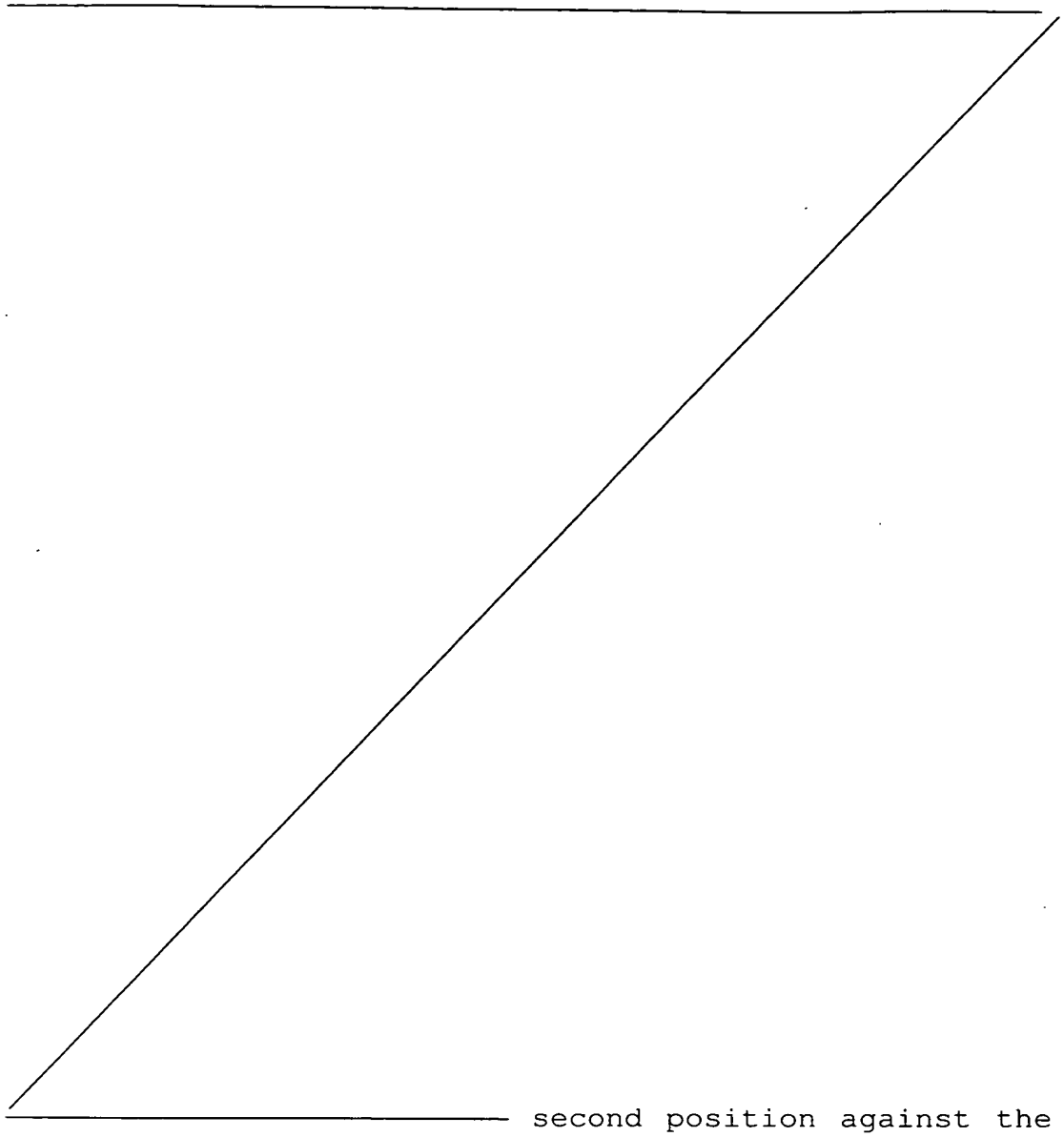
I hereby declare that all the statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent application issued thereon.

Date: January 13, 2005

Signature :

For and on behalf of RWS Group Ltd

Post Office Address : Europa House, Marsham Way,
Gerrards Cross, Buckinghamshire,
England.



second position against the direction of flow of the conveying fluid in the first position. The through-channel is arranged essentially perpendicularly to the rotation axis of the cylindrical rotary plug and often has a virtually round free cross section.

In corresponding single-channel diverter switches, depending on the length of the conveying path downstream of the deflection or downstream of the

valve, considerable pressure differences can partly occur between the two outflow channels. Corresponding diverter switches normally have elastic seals in order to minimize leakages which occur. In this case, the leakages depend, inter alia, on the pressure of the conveying fluid or transport gas in comparison with the atmospheric ambient pressure and also on the above-mentioned pressure differences between the outflow channels.

Corresponding seals may be accommodated in the diverter switch housing or in the rotary plug. For example, these seals are designed as inflatable seals or as static seals, in particular provided with a special profile shape, which press automatically against the mating body when pressure builds up in the conveying line.

The publication DE 199 52 435 A1 discloses a switch for bulk material with an inlet channel and at least two outlet channels, it being possible with the aid of a rotary plug for the inlet channel to be optionally connected to one of the outlet channels. For sealing, the rotary plug has an elastomer seal.

In addition, diverter switches with a flap are also known (cf. DE 96 80 47). As a difference from rotary plugs, flaps have two mutually separate through-regions, to connect the inlet optionally to the two outlet channels. Consequently, a comparatively thin directing element which can swing back and forth between two positions is necessarily provided between the two through-regions. By contrast, a rotary plug of the generic type for diverter switches has only one through-channel, which, for connecting the inlet channel to the two outlet channels to be selected, must be adjusted in such a way that the direction of

through-flow in the individual through-channel is reversed for the two positions.

A disadvantage with corresponding sealing systems, however, is that seal wear may occur, the corresponding seals being partly abraded. Since the seal material normally cannot be made of the same material as the bulk material to be conveyed, the abrasion of the seal leads to contamination of the material to be conveyed. In the case of very high-grade materials to be conveyed, or materials to be conveyed which are of very high purity, this abrasion is disadvantageous or even inadmissible. Used for such special applications are diverter switches which have as narrow a gap as possible between the plug and the housing in order thus to reduce the leakage losses.

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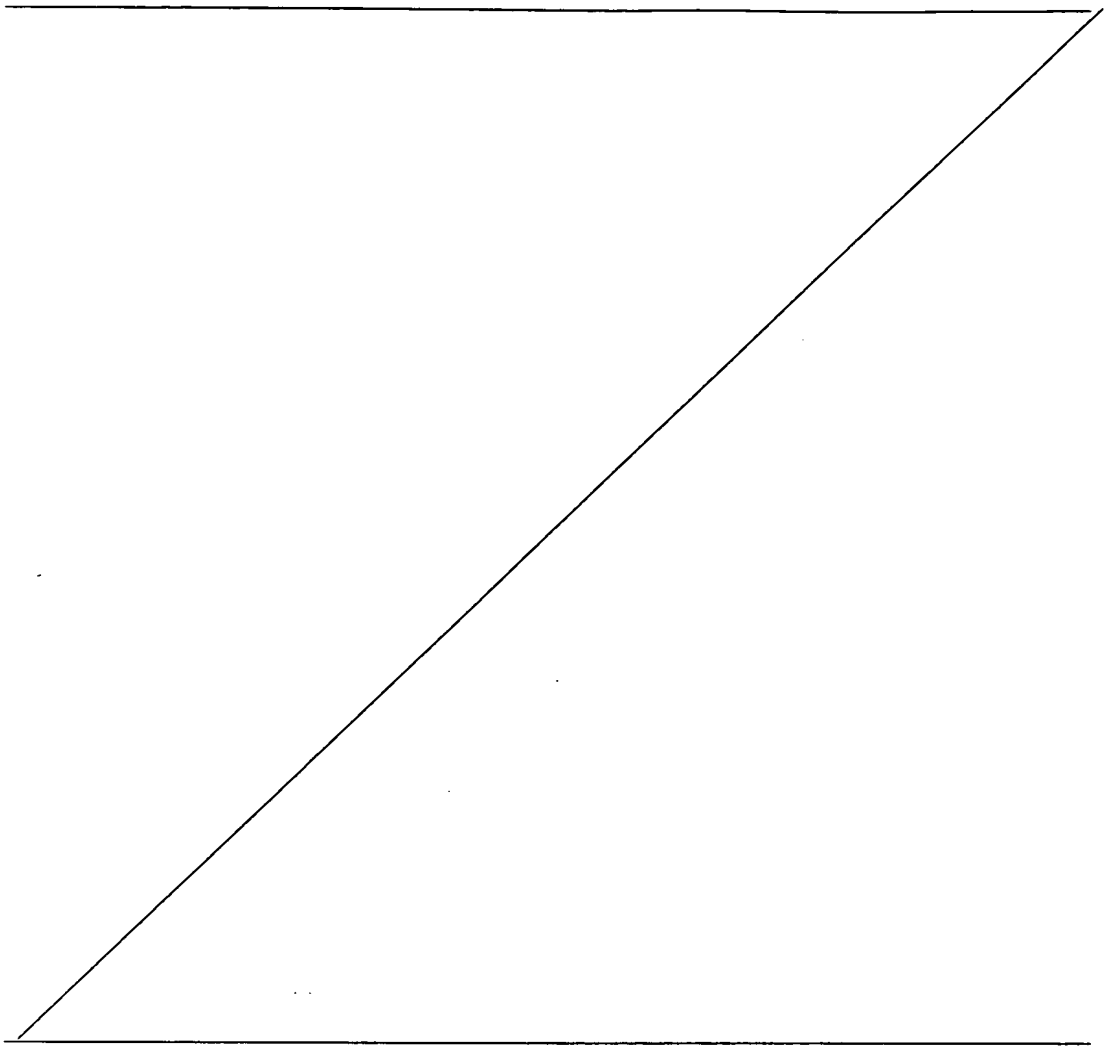

Advantageous embodiments and developments of the invention are possible by the measures mentioned in the subclaims.

Accordingly, the diverter switch according to the invention is characterized in particular by the fact that the rotary plug and/or the housing has at least one labyrinth seal arrangement comprising at least one labyrinth seal groove.

In a special variant of the invention, the labyrinth seal groove of the rotary plug is arranged largely continuously around at least one opening of the through-channel. In special applications, a labyrinth seal groove which is interrupted at least once and is generally arranged around the opening of the through-channel is conceivable; for example, particular sections of the rotary plug are realized with additional, corresponding labyrinth seal grooves. An advantage with these variants of the invention is that only two labyrinth seal arrangements, i.e. in each case one arrangement per opening of the through-channel, is required for realizing a fully sealed-off single-channel diverter switch.

Alternatively, or in combination with the aforesaid variants of the invention, the labyrinth seal groove of the housing may be arranged largely continuously around at least one of the connecting openings. In accordance with the aforesaid variants, is a labyrinth seal groove interrupted at least once or designed so that it is not closed is also conceivable in this case, this labyrinth seal groove possibly being additionally arranged at particular sections of the housing.

By means of a labyrinth seal arrangement according to the invention, a non-contact seal can advantageously be realized between the rotary plug and the housing, i.e. without an additional, separate seal, which is subjected to abrasion, being used in the process. In contrast to a contact seal, in which the seal surfaces touch one another and are generally pressed against one another, contact between the sealing surfaces is completely prevented in the case of a non-contact seal. On the contrary, according to the invention, the sealing effect is realized by the flow resistance of the substance to be sealed off by means of the free gap with labyrinth seal arrangement.

In a labyrinth seal arrangement or a labyrinth-gap seal arrangement, the pressure of the fluid in a chamber, widened section, recess or the like is advantageously reduced by vortex formation and throttling, a factor which, for example, in a labyrinth seal comprising a plurality of chambers, leads to the gradual pressure drop from chamber to chamber.

If need be, the labyrinth seal arrangement can be formed by an integrally formed portion, coating, inlay, etc., which is preferably made of the material of the rotary plug or housing or of a comparable material. In this case or otherwise, in a preferred embodiment of the invention, the labyrinth seal arrangement is designed as a recess, chamber, in particular as the labyrinth seal groove, in the rotary plug or housing. By means of an appropriate recess or groove, the seal according to the invention can be realized without a further, separate, or additional seal component. In this case, it is advantageous that, in an especially simple manner, with a contact seal element being dispensed with, it is absolutely certain that contamination or impairment of the bulk-material flow or conveying fluid cannot occur, and at the same time an advantageous sealing effect can be realized. According to the invention, the housing is thereby effectively sealed off relative to the rotary plug, so that leakages can be decisively reduced or completely or virtually prevented.

A plurality of labyrinth seal grooves arranged next to one another are advantageously provided. For example, about three to ten or more seal grooves are provided per seal. Each groove leads to a pressure drop, so that the sealing effect is improved with increasing number of grooves. The number of seal grooves is

advantageously adapted to the cost of realizing corresponding grooves.

In an advantageous embodiment of the invention, the housing is designed in such a way that it has in each case at least one labyrinth seal arrangement around each connecting opening. In these embodiments, there are therefore at least three corresponding labyrinth seal arrangements, so that at least two labyrinth seal arrangements are provided between two connecting openings. In this case, the third connecting opening, which is not involved in the conveying operation, is also additionally sealed off in an advantageous manner, so that the sealing effect in particular between the corresponding connecting openings is further improved, which additionally increases the operating reliability of the diverter switch according to the invention.

In a special development of the invention, at least one feed opening of a feed channel for feeding a suitable gap fluid into the region of the gap is provided. The diverter switch can be advantageously flushed by feeding a gap fluid into the gap between housing and plug. For example, gap fluid is fed to the gap at least in a rotary or adjusting phase of the rotary plug. Gap fluid can possibly be fed to the gap almost continuously and/or during the entire conveying operation.

By the feeding of the gap fluid into the gap according to the invention, relatively fine material to be conveyed, for example, can be advantageously

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Claims:

1. Diverter switch in particular for branching off bulk-material flows, having a rotary plug (1) which is arranged in a stationary housing (2) preferably comprising three connecting openings (4, 5, 6) and which, in a first position, realizes a connection of a first connecting-opening pair (4, 5) and, by rotation into a second position, realizes a connection of a second connecting-opening pair (4, 6), a gap (10) for the non-contact arrangement of the rotary plug (1) in the housing (2) without an additional contact sealing element being provided between the rotary plug (1) and the housing (2), characterized in that the rotary plug (1) and/or the housing (2) has at least one labyrinth seal arrangement (7), the labyrinth seal arrangement (7) comprising at least one labyrinth seal groove (8, 9), and in that the labyrinth seal groove (8) of the rotary plug (1) is arranged largely continuously around at least one opening of a through-channel (3), and/or in that the labyrinth seal groove (9) of the housing (2) is arranged largely continuously around at least one of the connecting openings (4, 5, 6).

2. Diverter switch according to Claim 1, characterized in that a plurality of labyrinth seal grooves (8, 9) arranged next to one another are provided.

3. Diverter switch according to one of the preceding claims, characterized in that at least one feed opening (12) of a feed channel for feeding a gap fluid into the gap (10) between rotary plug (1) and housing (2) is provided.

4. Diverter switch according to one of the preceding claims, characterized in that the labyrinth seal groove (8, 9) has the feed opening (12).

5. Diverter switch according to one of the preceding claims, characterized in that a pressure of the gap fluid is greater than a pressure of the conveying fluid.

6. Diverter switch according to one of the preceding claims, characterized in that a composition of the gap fluid essentially corresponds to a composition of the conveying fluid.

7. Diverter switch according to one of the preceding claims, characterized in that a maximum width (W) of the gap (10) is smaller than or equal to five-tenths of a millimetre ($W \leq 5/10$ mm) and is preferably smaller than or equal to three-tenths of a millimetre ($W \leq 3/10$ mm).